An expansin, according to the present invention, is a purified protein generally having greater than about 60% sequence similarity and preferably greater than about 70% sequence similarity with the amino acid sequence disclosed in SEQ. ID. NO: 1. In a corresponding manner, the applicable DNA sequence that expresses an expansin will have about 60% sequence similarity, and preferably greater than about 70% sequence similarity, with the nucleic acid sequence disclosed in SEQ. ID. NO: 1. The amino acid sequences identified in SEQ. ID. NO: 2 through SEQ. ID. NO: 6 are examples of sequences which meet the sequence similarity definition and thus are examples of expansins. Expansins equivalent to those described by this definition can be identified by their expansin characteristics, as explained throughout this specification, and all expansins are thus believed to be patentable equivalents.

B1

On page 47 please replace the paragraph at lines 6, under Example 10 with the following:

Effects of Cucumber Expansins on Cellulose Filter

Paper strips of Whatman number 3 filter paper (Whatman Lab Sales, Hillsboro, OR) (2 mm by 10 mm) were cut and were clamped in the constant load extensometer as described for cucumber hypocotyls sections. Extension was measured in 50 mM sodium acetate and in the same buffer containing protein fractions. Additionally, effect of expansins on the lost of mechanical strength of paper was measured by stress relaxation assay. For stress relaxation measurements, the paper was incubated in various pretreatment solutions and assayed while still wet, in the standard method.

B2

On page 50 please replace the paragraph starting at line 25, under Example 15 with the following:

Western Blot Analysis of Immunoreactivity between Expansin-like protein from Snail and Cucumber Expansin cEx-29.

Fig. 20 presents a Western blot of active HPLC-separated protein fractions from snail acetone powder, probed with antibody PA1 which was raised against cucumber expansin-29. The active fractions show a striking band at about 26kD, which is similar to (though slightly small than) cucumber expansin-29. This result provides strong evidence that the wall extension activity found in the snail acetone powder is due to a protein with similar antigenic determinants as cucumber expansin-29.

B3

On page 55 please replace the paragraph starting at line 28 with the following:

Isolation of a novel protein allows one to attempt the cloning of the gene coding for this protein using the standard approach of establishing an amino acid sequence of a fragment of the protein and designing oligonucleotides to screen the cDNA library. When cloned, the gene for one or more expansins will need to be expressed in a bacterial or other system to obtain sufficient quantities for the commercial usefulness of the ideas listed above. Cloning will also be a necessary first step for the commercial uses requiring genetic manipulation of the protein in transgenic plants.

B4

On page 61 please replace the paragraph starting at line 2, under the heading "Abstract of the Invention" with the following:

A new class of proteins and methods related thereto are presented. This new class of proteins, called expansins, can be characterized as catalysts of the extension of plant cell walls and the weakening of the hydrogen bonds in pure cellulose.

B5